

APPLICATION FOR UNITED STATES PATENT

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Invention:

VIDEO-ON-DEMAND WEB PORTAL

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CROSS-REFERENCE TO RELATED APPLICATIONS

The present application derives priority from U.S. Provisional Patent Application No. 60/268,135, filed: February 12, 2001.

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BACKGROUND OF THE INVENTION

1. Field of the Invention

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The present invention relates generally to on-line data libraries and more specifically, to data libraries containing digital audio/video information produced for transmission to the public. In other words, a video-on-demand web site for providing internet access for the uploading/downloading of PA or LO programming that is fully user interactive and inclusive.

2. Description of the Background

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The 1984 Cable Act allows municipalities to require cable franchise holders to provide a public access channel and make available equipment, studio space, and technical assistance. The purpose is to avoid monopolization of cable TV by too few sources and to ensure programming of local community interest. Municipalities typically take advantage of this and require that certain cable television channels be set aside for noncommercial, nonprofit organizations and private citizens. This is accomplished in the franchise agreements with each jurisdiction, which specify that certain dedicated channels be set aside to broadcast public access/local origination

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5 (PA/LO) programming. The franchise fees shown on the cable TV bills issued to individual households, cable operators, and municipalities are usually applied toward one or more dedicated channels, one or more fully equipped studios to produce PA/LO programs, and free air time for viewing those programs on the aforementioned channel(s).

10 Unfortunately, the production and viewing of PA/LO has a number of inherent limitations. The construction and maintenance of a production studio and its equipment is very expensive. Public viewing of the PA/LO programs is limited to the dedicated cable channel(s) and available time slots (i.e. scheduling). Often, a general lack of interest exists within the viewing audience due to the limited number of actual programs, and the frequent lack of production quality for those that are aired. Finally, rather than being subject only to FCC regulations, PA/LO programming can become a political hotbed when local authorities attempt to impose their own, more restrictive interpretation of applicable censorship laws.

15 Technological advances provide some relief from these limitations. For example, production quality is on the increase because many audio/video camera systems, even those for home use, are higher quality digital. In addition, image management and communications systems are evolving from film- based systems toward an all-digital environment where imagery is acquired, transmitted, analyzed, and stored using digital computer and communications technologies. However, the throughput required for communicating digital video is extremely large, consisting of thousands of terabytes of imagery per day. Temporal requirements for capture and dissemination of single images are stringent, ranging from seconds to at most several minutes. Moreover, distribution now entails multiple distribution to geographically distributed

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5 users who will require on-demand, interactive access to the data. The underlying network requires the use of multicast protocols to transmit to numerous workstations with differing processing and display capabilities, the data traveling over a heterogeneous network with bandwidths varying by up to six orders of magnitude between the initial down link and the slowest end user. Multicast protocols used for image communications must address several requirements. Setting up a multicast group assigning a multicast group address. All multicast traffic is then delivered to this address, which implies that all members of the group must be listening for traffic with this address. Several existing protocols provide varying levels of support for multicasting, including IP/Multicast, the Xpress Transfer Protocol (XTP), and Experimental Internet Stream Protocol, the Multicast Transport Protocol (MTP), etc. There are significant problems with all of the major multicast protocols for the reliable, adaptive multicast transport of large data items. The problems include inadequate address management, excessive processing of control information, poor response to network congestion, inability to handle high priority traffic, and sub-optimal error recovery and retransmission procedures.

As a result of the foregoing problems, the traditional approach is to maintain large libraries of video files in a large number of geographically dispersed locations in order to provide reasonably rapid access for widely disbursed users. The cost of creation and maintenance of such multiple video libraries, along with the local distribution facilities, is often prohibitive. In addition to the cost, the difficulty in scheduling viewing and managing the local distribution of such videos makes video distribution systems rare and inefficient.

5 Therefore, there exists a need for an on-line (i.e. internet-accessible) data library of
PA/LO programming in order to provide a more public-friendly means for accessing the
available information. To fulfill its public access charter, the internet accessible library must
truly be user-friendly to encourage widespread access. This should at least include providing
access for widely distributed users to upload and view program audio/video online and, where
10 desired, to download the data to the user's remote computer without requiring multi-cast
addresses. At the same time there must be a built-in administrative approval process for the
resulting content. Applicants are not aware of any existing systems or methods that provide the
foregoing capabilities and benefits.

15 SUMMARY OF THE INVENTION

It is, therefore, an object of the present invention to provide a process for storing, or
warehousing, digital audio/video of PA/LO programs for on-line distribution to the public.

It is still another object to provide a process for uploading/downloading the audio/video
data that is user interactive and inclusive.

20 In accordance with the above objects, the present invention is a system for centrally
warehousing digital audio/video of PA/LO programs, and for remotely reviewing, authorizing
and thereby controlling accessibility of said programs by the public. The system involves an
architecture as well as a method for using the same.

The method for distributed maintenance and publishing control of a library of video files
25 for public access over the internet includes the steps of uploading digital video works from

5 independent producers to a central upload site, tagging each digital video work with an abstract
of information including any fields from among the group comprising subject matter category,
subject, date, runtime, author, and rating, storing each tagged work with associated abstract in a
database on a web-enabled network server, periodically canvassing the abstracts on said network
server and compiling a catalog of available works at the server, and maintaining a remote
10 content review/control site for reviewing and controlling availability of said digital video works
for public access. The remote content review/control site periodically polls the catalog at the
network server to ascertain when new works are available. When a new work is available, the
remote content review/control site has the ability to screen each new digital video work by
abstract and or by its content in real time by audio/video streaming. The remote content
15 review/control site can thereby approve or disapprove each work for public access viewing over
the internet. In this manner, the content review/control site serves as a gatekeeper to screen
those works that are appropriate for general public access.

The architecture for supporting the above-described method includes a central web-
enabled server accessible over a distributed communication backbone for storing a central
20 library of multimedia content, and a network administrator for maintaining a library of works at
the central server and for tagging each new work with an abstract of information and storing the
multimedia work with associated abstract in the central library. A catalog of available
multimedia works is intermittently and automatically compiled from the abstracts and stored as
well on the central server. Additionally, a remote content review/control site is maintained by an
25 administrator (such as a CATV station). The remote content review/control site intermittently

5 polls the catalog maintained on the central server to ascertain when new works have become
available. A reviewing authority operates the remote content review/control site and can thereby
review and/or edit the abstract of information, view each corresponding work, and
approve/disapprove each such work for public access. When a particular work is deemed suitable
by the remote content review/control site, a publication approval message is sent to the network
10 administrator indicating that the work should be made available by streaming for general public
access.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects, features, and advantages of the present invention will become more
15 apparent from the following detailed description of the preferred embodiments and certain
modifications thereof when taken together with the accompanying drawings in which:

FIG. 1 is a flow chart illustrating the interactive process according to the present
invention.

FIG. 2 is a network diagram illustrating an exemplary network infrastructure for
20 supporting the preset invention

FIG. 3 is a flow-chart illustration of the method of the present invention.

FIG. 4 is a screen print of the template by which the Administrator 40 enters the abstract
of information.

5 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

 In accordance with the present invention, a system and method are shown for distributed maintenance and publishing control of a library of video files for public access over the internet in order to provide a real time administrative approval process and, once approved, real time access for widely distributed users.

10 The present system accomplishes the foregoing by separating network administration from publishing control, resulting in a video library management system (VLMS) that makes video distribution over a wide area network both economically and technically practical. Streaming multimedia file access is provided to users over a wide area network. The VLMS is described herein in the particular context of a public access video solution that provides a forum to exhibit the creative efforts of the independent film maker, video maker, musician and/or artist.

15 In the above-described context of a public access video solution, the system implements the communication flow diagram of FIG. 1. Generally, independent film makers, video makers, musicians and/or artists ("producers") 10-1..n independently develop multimedia content. If they choose to submit their work for public access distribution over the VLMS, they must send or upload their content to a central upload site 30. A network Administrator 40 maintains a library of the multimedia content at the central upload site 30. This maintenance function includes tagging each work with an abstract of information and storing the work with associated abstract in a central library. A catalog of available works in the library is intermittently compiled from the abstracts, and the catalog is maintained at the central upload site 30.

5 A reviewing authority such as the cable television company operates a remote content
review/control site 20 by which they review and, if necessary, edit the abstract of information,
view the submitted works, and approve/disapprove each such work for public access. The
remote content review/control site 20 intermittently polls the catalog maintained by the network
Administrator 40 at the central upload site 30 to ascertain when new works have become
10 available. The remote content review/control site 20 can physically be any computer (or
network of computers) with web access and proper authorization. Based on the abstracted
information in the catalog, the content review/control site 20 is able to screen and
approve/disapprove each video or other submission by producers 10, edit the abstract, specify a
viewer rating, and fully review the content of each work if necessary, thereby acting as a
15 gatekeeper to screen those works that are appropriate for general public access. If a particular
work is deemed suitable, a publication approval message is sent to Administrator 40 and the
work is made available for public access by the Administrator 40. All existing media content is
centrally stored by Administrator 40, but is available in real time to content review/control site
20 and by streaming to each viewer 50-1...n once approved by content review/control site 20.

20 FIG. 2 is a network diagram illustrating an exemplary network infrastructure for
supporting the method of the present invention. The above-described participants are given
seamless point-to-multipoint communication capabilities within the network, and the
infrastructure integrates multi-media streaming capabilities into the computer communication
process by packet-based communication. The producers 10-1..n upload artistic works to
25 Administrator site 40 either manually or by computer. After digitalization (if necessary), the

5 Administrator 40 adds the media file to a dynamic database of such files resident on the central
upload server 40-1 of Administrator station 40. The database is structured to tag the multimedia
file with a template of abstract information to be entered by the Administrator 40. The database
may be an SQL database created with conventional SQL server software. The remote content
review/control site 20 will be manned by a cable television company having an in-house LAN
10 with server 20-1 and multiple employees authorized to serve as approval authorities each with
web access via a client station 20-2...n, and each with a distinct login identification and
password. The remote content review/control site 20 intermittently polls the catalog maintained
by the network Administrator 40 to ascertain when new works are available. Based on the
abstracted information in the catalog, the content review/control site 20 is able to screen each
15 video or other submission by producers 10, fully review each work if necessary, and act as
gatekeeper, screening those works that are appropriate for general public access. If a particular
work is deemed suitable, the remote content review/control site 20 sends a publication approval
message back to Administrator 40 and the work is made available for public access by the
Administrator 40. All existing media content is available in real time to the content
20 review/control site 20 and by streaming to each viewer 50-1...n (contingent on approval by
content review/control site 20). Streaming video is a sequence of "moving images" that are sent
in compressed form over the Internet and displayed by the viewer as they arrive. With streaming
media, a Web user does not have to wait to download a large file before seeing the video or
hearing the sound. Instead, the media is sent in a continuous stream and is played as it arrives.
25 Both viewer 50 and content reviewer 20 are loaded with a software player for streaming video.

5 The player can be either an integral part of their existing browser software or a standalone
program. Either way, a variety of players are readily commercially available. Major streaming
video and streaming media technologies include RealSystem G2 from RealNetwork, Microsoft
Windows Media Technologies (including its NetShow Services and Theater Server), and VDO.
Microsoft's technology offers streaming audio at up to 96 Kbps and streaming video at up to 8
10 Mbps (for the NetShow Theater Server). However, for most Web users, the streaming video will
be limited to the data rates of the connection (for example, up to 128 Kbps with an ISDN
connection). Microsoft's streaming media files are in its Advanced Streaming Format (ASF,
WMA, WMV).

A more detailed explanation of the salient steps in the above-described process follows
15 with reference to FIG. 3, which is a flow-chart illustration of the method of the present
invention.

Step 100: Video Submission

In order to submit video and/or other media material to the Administrator 40, each
20 producer must read and sign a waiver agreement that gives permission to the station to make the
material available for viewing and for broadcast over the Internet without any rights or
expectations to privacy in the material. The agreement will also indemnify the station against
the wrongful acts of the producer, such as copyright infringement. The producer 10 either signs
the foregoing agreement and sends a physical copy of the videotape, or logs onto the
25 Administrator server 40-1, fills the electronic equivalent of the form.

5 Once the form is completed, the producers 10-1..n may upload artistic works to
Administrator site 40 either manually or by computer. If manually, a video tape is mailed in
accordance with a specified protocol described to the producers. The video tape in NTSC format
is then digitized by Administrator 40 and stored on the central upload server 40-1 using
conventional digital imaging equipment and a high-speed digital capture program. For example,
10 Pinnacle Systems offers the miroVIDEO DC50 broadcast quality composite to analog input and
output video capture. The digital video is preferably stored in advanced video imaging format
(AVI).

15 If, instead, the media is uploaded in digital form this can be accomplished over the
network of Fig. 1 by standard file transfer. To accomplish this, the Administrator server 40-1
preferably uses the built in file upload features of the Microsoft IIS server (if the system is
implemented on another platform, such as Apache or Websphere, each has an upload counterpart
feature). These upload capabilities are not standard file transfer protocol (FTP), but a true port
upload so as to avoid any firewall issues. All file security may be set by the administrator at the
Administrator server 40-1 (including all access, approval required, no access, etc.). These
20 capabilities are graphically integrated Internet Explorer® and Netscape® extension, thereby
giving producers 10-1..n the ability to accomplish their own upload without any need for any
technical knowledge of FTP or other protocols.

Step 200: Preliminary Processing at the Central Upload Site 30

5 Once the upload session is complete and the file has been uploaded directly to the Central
Upload Site 30, a variety of pre-processing sub-tasks are performed before the content can be
added to the VLMS library. First of all, for uploaded files the Administrator 40 runs a file
checking module to verify the file type and to check the file size and other desired
characteristics. The system accepts any compressed video file type for
10 recompression/translation, and the files can be stored in the library in any such format (MPG,
MOV, AVI, RM). Presently, files are stored in the VLMS in AVI format. The file checking
module also has the ability to screen uploaded files by file size, extension or name. When a file
is verified as valid, the checking module spawns a COM (Component Object Model) function to
whichever industry file encoder is needed (IE REAL, Windows Media, QuickTime, AVI, or any
15 future encoding standard. After encoding the file in a uniform format such as AVI (or other), it is
added to the VLMS database of files needing approval, and an administrative alert is sent to the
Administrator 40 based on any method selected by the administrator (Page, Email, none).

20 Once the uploaded file has been screened and/or converted to the proper format at the
central upload site 30 or, alternatively, a mailed video has been digitized accordingly, the
Administrator 40 adds the media file to a dynamic database of such files resident on the central
upload server 40-1 of Administrator station 40. The database may be an SQL database created
with any conventional SQL server software. For example, Microsoft SQL Server 7.0 software
can be used. It is also important to note that the system works on any conventional web hosting
platform, including Apache, IIS, and Netscape servers.

5 The database is structured to allow the Administrator 40 to tag the multimedia file with a
template of abstract information. FIG. 4 is a screen print of the template by which the
Administrator 40 enters the abstract of information. The template preferably includes data entry
fields for Media Category, Media Subject, Media Date, Media Runtime, Media Author, and
Media Rating. The Media Category, Media Date, Media Runtime and Media Rating fields are
10 preferably drop-down selection boxes with pre-defined categorical selection choices. In
addition, the template includes a keyword entry field to allow the Administrator to search the
abstracts in the database for abstract records matching a specified query. After making the
appropriate selections and entries, the Administrator 40 stores the work with associated abstract
in the database on server 40-1. A catalog of available works in the library is intermittently
15 compiled from the abstracts.

Step 300: Review by the Remote Content Review/control Site 20

 The Remote Content Review/control Site 20 is a web portal accessible by authorized
content reviewers and capable of communicating with the database engine running on a
20 structured query language (SQL) server at the Administrator's site 40. Thus, the remote content
review/control site 20 can physically be any computer with web access and proper authorization.
Typically, in the public access video context, the remote content review/control site 20 will be
manned by a cable television company having an in-house LAN with server 20-1 and multiple
employees authorized to serve as approval authorities each with web access via a client station
25 20-2...n, and each with a distinct login identification and password. The remote content

5 review/control site 20 intermittently polls the catalog maintained by the network Administrator
40 to ascertain when new works are available. Based on the abstracted information in the
catalog, the content review/control site 20 is able to screen each video or other submission by
producers 10, fully review each work if necessary, and act as gatekeeper, screening those works
that are appropriate for general public access. At the reviewer client stations 20-2-1...n, each
10 content reviewer is presented with a graphical interface with the following menu options:

Enable / Disable Site

Add a Media Category (The Remote Content Review/control Site 20 can designate a
new category description, and then subsequently assign videos to that category for ease of
management and searching).

15 View Media Pending Approval

Edit Approved/Unapproved Media (This option calls up an interface that allows the
Remote Content Review/control Site 20 to make any final changes deemed necessary to make
the media “approvable”).

Choose Top Stories (This option allows the Remote Content Review/control Site 20 to
20 designate which media file(s) will be showcased on user-accessible web pages corresponding to
the designated media categories, as well as an overall homepage for the public access library.
Any given designation may appear on the homepage and/or embedded category page as an
advertisement for and/or link directly to the designated media file.

If the content reviewer chooses “View Media Pending Approval” a list of the newly
25 available media file(s) appears. The list is taken directly from the catalog of available that is

5 compiled from the abstracts entered by Administrator 40. By selecting any given work on the
list of the newly available media file(s), the Remote Content Review/control Site 20 is presented
with the same template depicted in Fig. 4. This allows the Remote Content Review/control Site
20 to enter and/or edit previously entered information for any of the pre-defined data entry
fields. By depressing the >Upload Media button, the Remote Content Review/control Site 20
10 dynamically pulls the media off of the Administrative server 40-1 through standard TCP/IP
protocols, and the media is streamed directly to the Remote Content Review/control Site 20 and
is displayed in a second standard browser window or software media player as described in the
next section. As before, this may be accomplished within Internet Explorer®, thereby
eliminating the need for any technical knowledge on the part of the Remote Content
15 Review/Control Site 20. Finally, the Remote Content Review/Control Site 20 can select an
appropriate Media Rating (e.g., R, PG-13, PG, G, etc.) from the drop-down window and this is
attached to the abstract record.

Step 400: Approval and Publication

20 After fully reviewing the abstract and the media itself, the content reviewer at the Remote
Content Review/control Site 20 simply clicks an approval button. By this action, the remote
content review/control site 20 sends a publication approval message back to Administrator 40
and the work is made available for public access. All approved media content is centrally stored
by Administrator 40, but is available in real time to content review/control site 20 and by
25 streaming to each viewer 50-1...n.

5 The turn-around time from upload /approval/publishing can be as little as the upload time of the media. This is dependant on the speed of the internet connection provided to the upload workstation. A typical High speed line will upload 5 minutes of video in about 40 seconds (T1). In reality, data is collected by a dynamic database form, uploaded to an approval site, and then published, all within a period typically less than 5 minutes.

10 The combination of features used in the present invention provides an efficient strategy for accessing video files from one video file library and delivering those video files to a widely distributed geographical area at a reasonable cost over a relatively slow wide area network.

15 Having now fully set forth the preferred embodiment and certain modifications of the concept underlying the present invention, various other embodiments as well as certain variations and modifications of the embodiments herein shown and described will obviously occur to those skilled in the art upon becoming familiar with said underlying concept. It is to be understood, therefore, that the invention may be practiced otherwise than as specifically set forth herein.